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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,974	10/05/2005	Naoki Toshima	TAN-116	3613
54630                      7590                      06/19/2009 ROBERTS & ROBERTS, LLP ATTORNEYS AT LAW P.O. BOX 484 PRINCETON, NJ 08542-0484				
EXAMINER				
GODENSCHWAGER, PETER T				
ART UNIT		PAPER NUMBER		
1796				
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06/19/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/551,974

**Applicant(s)**

TOSHIMA ET AL.

**Examiner**

PETER F. GODENSCHWAGER

**Art Unit**

1796

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 10-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

Applicant's reply filed March 10, 2009 has been fully considered. Claims 10 and 11 are amended, claims 1-9 and 15-19 are canceled, and claims 10-14 are pending.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shizuko (JP 11-241107A, English machine translation relied upon for citation purposes) in view of Wang et al. ("Preparation of Pd-Pt Bimetallic Colloids with Controllable Core/Shell Structures", *J. Phys. Chem., B*, 1997, 101, 5301-5306).

Shizuko teaches a process for producing a ternary metal colloid (nanoparticles) forming a core/shell structure ([0005], [0006], [0010]) comprising forming a solution/dispersion of two different metal salts in a solvent to form the metal colloid/nanoparticles ([0005], [0006], [0010]). Shizuko further teaches where the metal nanoparticles may be Ni, Pt, Pd (reduction catalysts) ([0014]) Shizuko further teaches adding a third metal ion to the solution of the metal colloid to form another layer on the metal colloid.

Shizuko does not teach the process where the first and third metal ions are initially dissolved in a second solvent and then mixed with the metal colloid. However, it is prima facie obvious in the absence of new or unexpected results to change the sequence of addition of

ingredients (i.e. adding metal ion to solvent then mixing two solutions as opposed to adding metal ion to an already formed solution) (see MPEP 2144.04 IV).

While Shizuko teaches a third and fourth metal ion is formed as a layer ([0010]), Shizuko does not explicitly teach that the third and fourth metal ions are different metals than the first or second metals. However, Shizuko teaches that “at least one kind or two kinds or more of transition metal ions” may be used for the formation of the nanoparticles ([0008], Pg. 3, Lns. 19-20). At the time of the invention, a person of ordinary skill in the art would have found it obvious to use two or more different metal ions to form layers (i.e. three different metals total) in the process and would have been motivated to do so based on the desired electrical conductivity, thermal conductivity, or catalytic effect desired, depending on what particular field the nanoparticles would ultimately be used in ([0002]).

Shizuko does not teach the process comprising the step of reducing the metal ions with hydrogen, where the hydrogen is absorbed on the particles. However, Wang et al. teaches a process of forming metallic colloids with core/shell structures comprising using hydrogen as a reducing agent, where the hydrogen is absorbed on the metal particles (Pg. 5302, Col 1, ¶3 - Col 2, ¶2 and Figure 1). Shizuko and Wang et al. are analogous art because they are concerned with the same field of endeavor, namely metallic colloids with a core/shell structure. At the time of the invention, a person of ordinary skill in the art would have found it obvious to use the hydrogen reduction step of Wang et al. in the process of Shizuko and would have been motivated to do so because Wang et al. teaches that this step provides for controllable core/shell structures (Pg. 5301, Col 2, ¶2).

Claims 11, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shizuko (JP 11-241107A, English machine translation relied upon for citation purposes) in view of Wang et al. ("Preparation of Pd-Pt Bimetallic Colloids with Controllable Core/Shell Structures", *J. Phys. Chem., B*, 1997, 101, 5301-5306).

Shizuko teaches a process for producing a ternary metal colloid (nanoparticles) forming a core/shell structure ([0005], [0006], [0010]) comprising forming a solution/dispersion of two different metal salts in a solvent to form the metal colloid/nanoparticles ([0005], [0006], [0010]). Shizuko further teaches where the metal nanoparticles may be Ni, Pt, Pd (reduction catalysts) ([0014]) Shizuko further teaches adding a third metal ion to the solution of the metal colloid to form another layer on the metal colloid.

Shizuko does not teach the process where the third metal ions is initially dissolved in a second solvent and then mixed with the metal colloid. However, it is prima facie obvious in the absence of new or unexpected results to change the sequence of addition of ingredients (i.e. adding metal ion to solvent then mixing two solutions as opposed to adding metal ion to an already formed solution) (see MPEP 2144.04 IV).

While Shizuko teaches a third and fourth metal ion is formed as a layer ([0010]), Shizuko does not explicitly teach that the third and fourth metal ions are different metals than the first or second metals. However, Shizuko teaches that "at least one kind or two kinds or more of transition metal ions" may be used for the formation of the nanoparticles ([0008], Pg. 3, Lns. 19-20). At the time of the invention, a person of ordinary skill in the art would have found it obvious to use two or more different metal ions to form layers (i.e. three different metals total) in the process and would have been motivated to do so based on the desired electrical conductivity,

thermal conductivity, or catalytic effect desired, depending on what particular field the nanoparticles would ultimately be used in ([0002]).

Shizuko does not teach the process comprising the step of reducing the metal ions with hydrogen. However, Wang et al. teaches a process of forming metallic colloids with core/shell structures comprising using hydrogen as a reducing agent, where the hydrogen is absorbed on the metal particles (Pg. 5302, Col 1, ¶3 - Col 2, ¶2 and Figure 1). Shizuko and Wang et al. are analogous art because they are concerned with the same field of endeavor, namely metallic colloids with a core/shell structure. At the time of the invention, a person of ordinary skill in the art would have found it obvious to use the hydrogen reduction step of Wang et al. in the process of Shizuko and would have been motivated to do so because Wang et al. teaches that this step provides for controllable core/shell structures (Pg. 5301, Col 2, ¶2).

### ***Response to Arguments***

Applicant's arguments filed March 10, 2009 have been fully considered but they are not persuasive.

Applicant argues that Shizuko does not teach the sequence of steps as instantly claimed. However, as set forth above, it is prima facie obvious in the absence of new or unexpected results to change the sequence of addition of ingredients (i.e. adding metal ion to solvent then mixing two solutions as opposed to adding metal ion to an already formed solution) (see MPEP 2144.04 IV). Furthermore, with regards to Applicant's assertion that Shizuko teaches merely adding a plurality of metal ions to a metal colloid solution, Shizuko clearly teaches (as cited above in [0010] "[o]ne by one, if the third and fourth transition metal ion is added, the layer of

the third and fourth metal atom will be formed..." clearly teaching adding the metal ions sequentially and not merely mixing them in a solution at once. As Shizuko teaches that when the metal ions form a complex, stratified structure together (i.e. when a layer is formed) "a metal ion is returned to a metal atom" (i.e. its oxidation state returns to zero, it is reduced) ([0009]), *Shizuko also teaches that the metal ions are reduced to form a binary colloid solution.*

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant argues that Shizuko is silent as to whether the colloid should be provided with reducing ability or not, however, the metals that Shizuko teaches Ni, Pt, Pd ([0014]) when combined with the teaching of Wang et al. concerning adding hydrogen as set forth above, would form reduction catalysts and would therefore inherently have such a property. Therefore, by forming the initial coated layer on the first nanoparticle present, Shizuko in view of Wang et al. will be providing a second nanoparticle with reducing capability.

Applicant argues that Wang et al. does not teach that hydrogen reduces other metals, however Wang et al. clearly teaches that hydrogen is used as a reducing agent (Pg. 5301, Col. 2, ¶2). Applicant further argues that Wang et al. does not teach adding the hydrogen to a reduced colloid. However, Wang et al. clearly teach that noble metals like Pd and Pt (metals are not salts and thus are in their reduced state) have the ability to absorb hydrogen (Pg. 5302, Col. 2, ¶2). Furthermore, Wang et al. teaches explicitly adding hydrogen to Pd core colloid (i.e. a reduced metal) (Pg. 5302, Col. 1, ¶1).

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER F. GODENSCHWAGER whose telephone number is (571)270-3302. The examiner can normally be reached on Monday-Friday 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P. F. G./  
Examiner, Art Unit 1796  
June 9, 2009

/Mark Eashoo/  
Supervisory Patent Examiner, Art Unit 1796